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(54) An energy regulator

(57) An energy regulator for regulating the power supplied to a heating element 12 consists of a slideable member 2 mounted in a supporting body 1 and kept constantly in contact with a cam surface 6 of a cam member 3.

Movement of the member 2 provides a set angular disposition, dependent on the required temperature of the heating element 12, between a bimetallic temperature sensor 11 and a spring 14. As the temperature of the heating element 12 increases, the bimetallic temperature sensor 11 straightens, thus changing the angular disposition between it and the spring 14, until a point is reached when the spring 14 causes electrical contact 9 to snap upwards from electrical contact 8, so as to disconnect the power supply from the heating element 12.

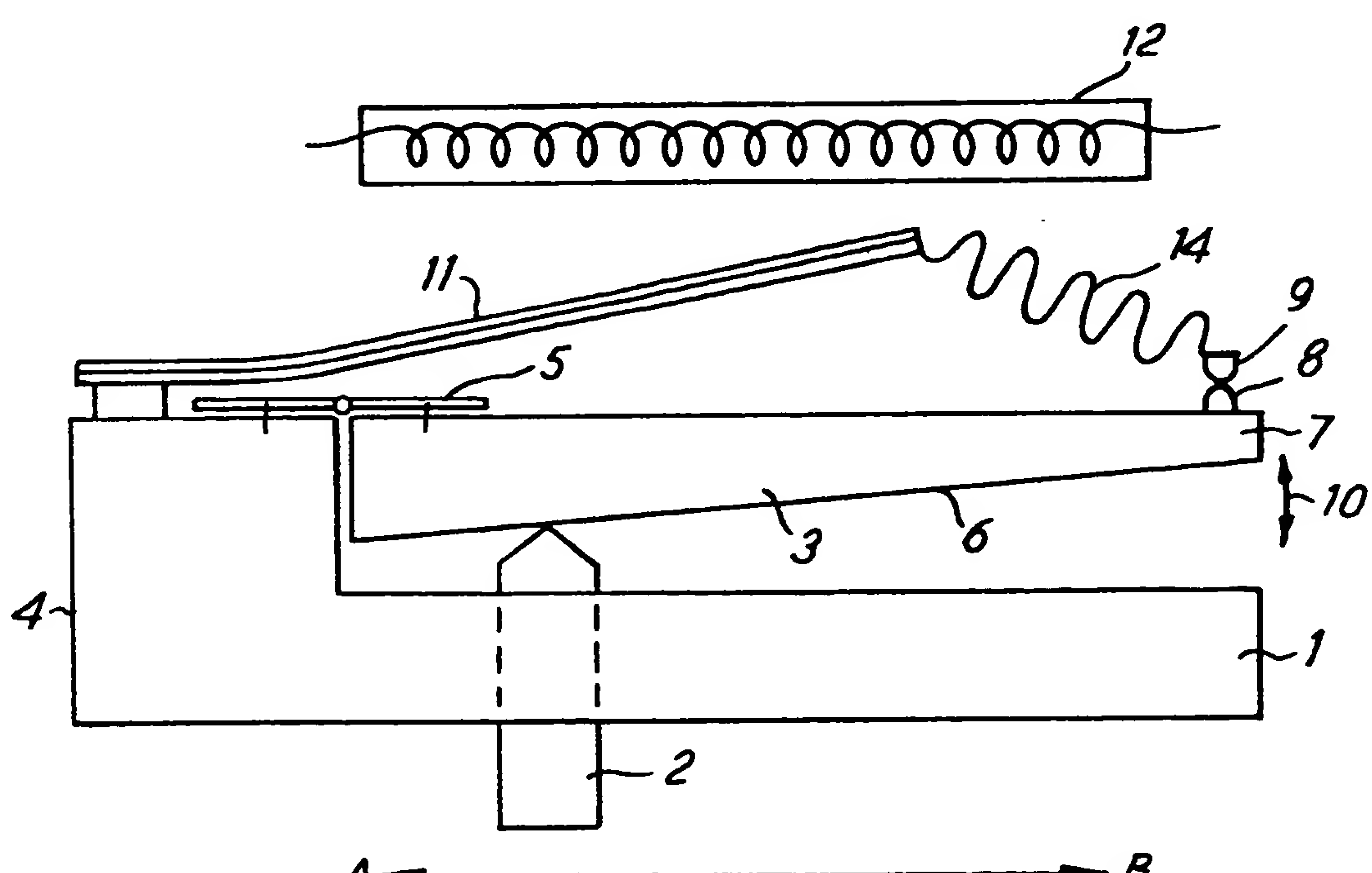

FIG. 1

The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

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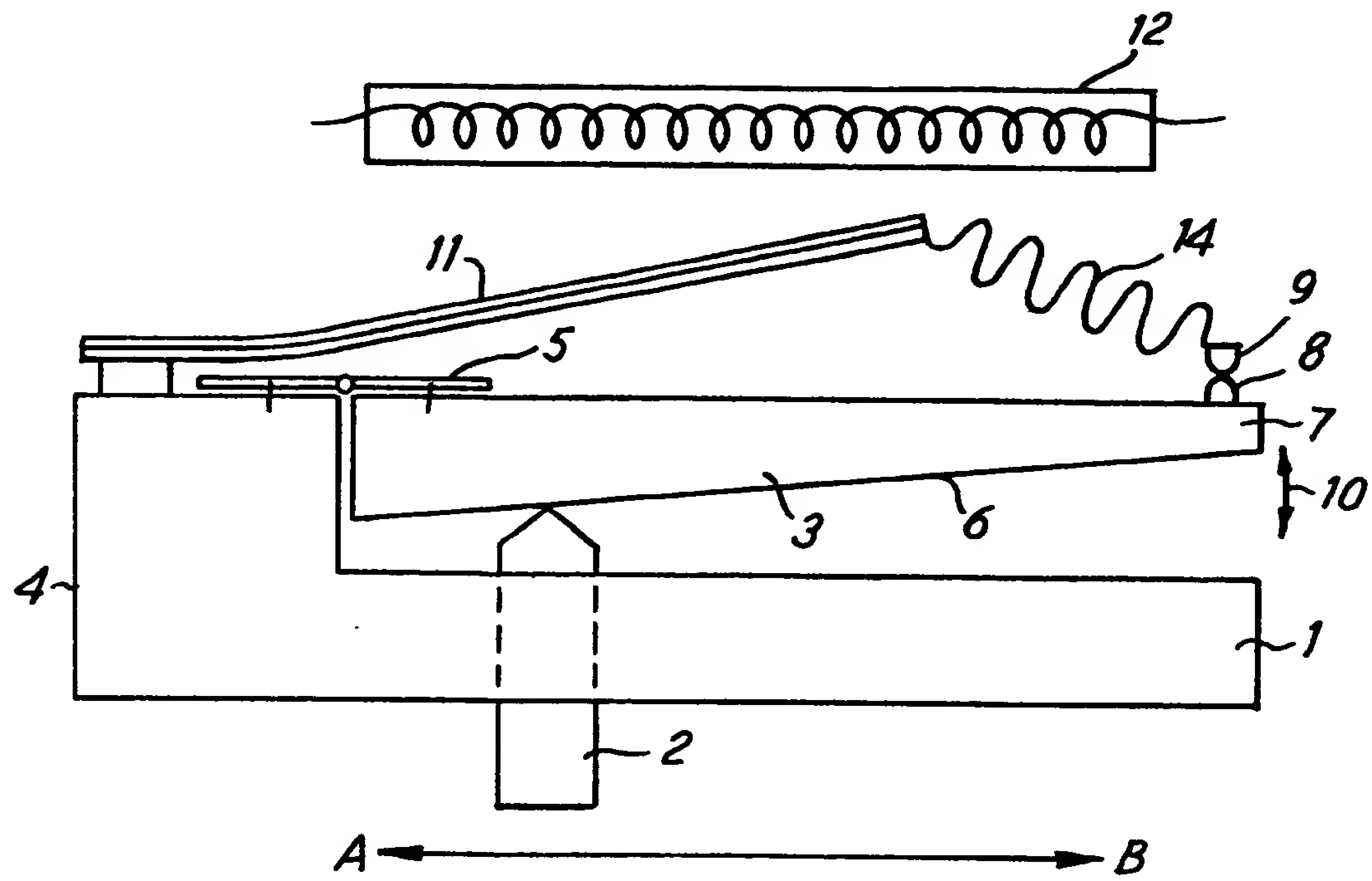

FIG.1

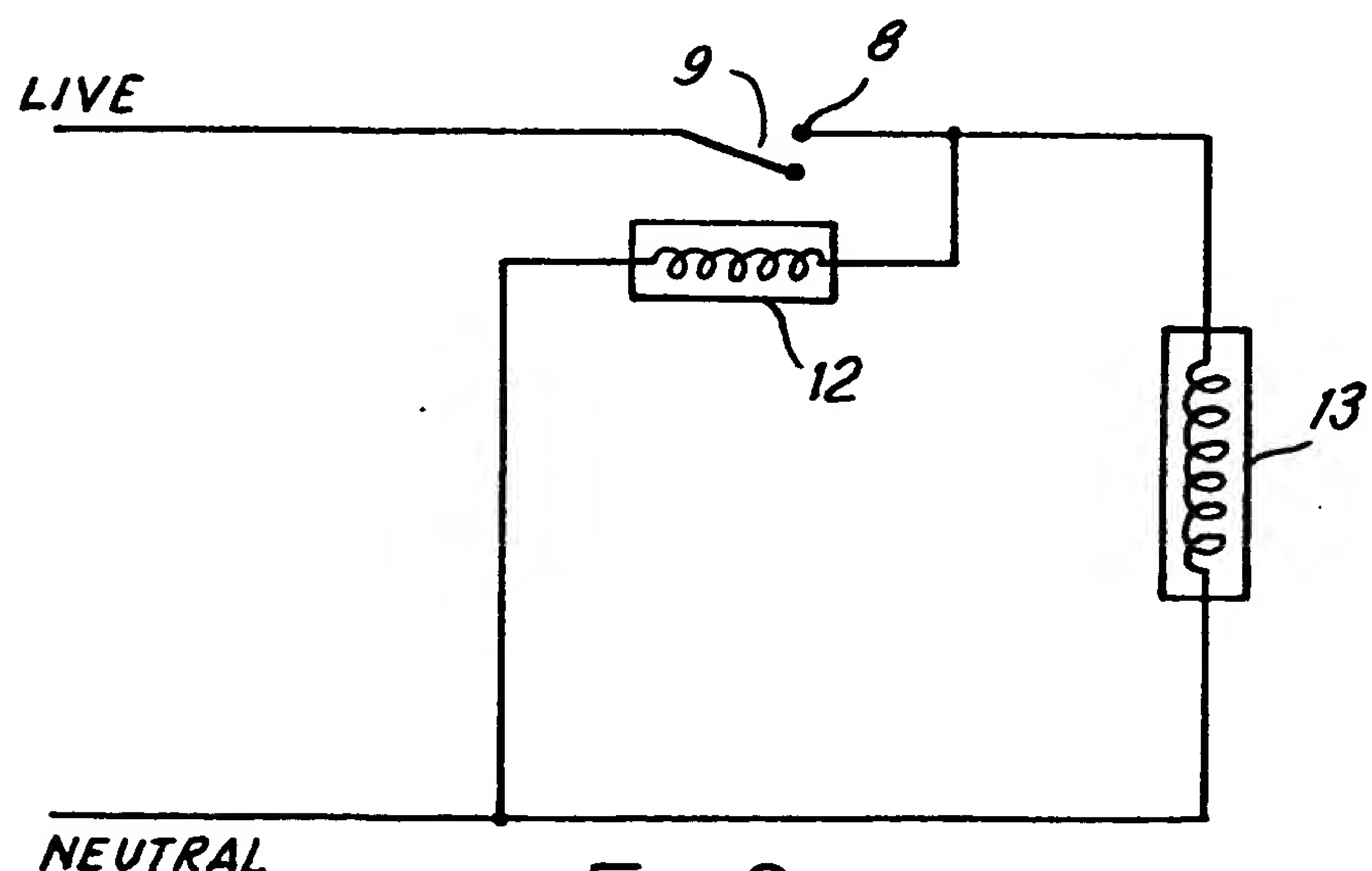

FIG.2

SPECIFICATION

An energy regulator

This invention relates to an energy regulator and in particular, though not exclusively, to one which regulates the supply of energy to a heating element of a heating appliance, such as a cooker.

An energy regulator of this type is conventionally rotary actuated and generally regulates the supply of energy to the heating element in accordance with a required temperature of the element, which may be manually set by rotation of the regulator.

The regulator includes a spring, one end of which is connected to a pair of electrical contacts and the other end of which is connected to a bi-metallic temperature sensor, which senses the temperature of the heating element.

As the regulator is rotated, the pair of contacts are spaced fom the heating element by a predetermined amount, thus producing a predetermined angular disposition between the spring and the bi-metallic temperature sensor, the spacing, and thus angular dispositon, being indicative of a required temperature of the heating element.

Subsequent movement of the bi-metallic sensor as the temperature of the heating element increases, causes the spring to snap open the electrical contacts when the required temperature is reached, thus disconnecting the energy supply to the heating element.

Conversely, when the temperature of the heating element has decreased sufficiently, the movement of the bi-metallic temperature sensor will cause the angular disposition between the bi-metallic temperature sensor and the spring to return to its original predetermined state, which thus causes the spring to snap shut the electrical contacts, thereby reconnecting the energy supply to the heating element.

However, a rotary actuated energy regulator, which generally requires a rotatable dial or knob on the heating appliance as a manually-operable control therefor may not be considered particularly desirable or suitable for an appliance for which slidable controls are used as a preferred arrangement.

It is therefore an object of the present inventon to provide an energy regulator which may be slideably actuated. It is another object of the invention to provide such a regulator which is compact and rugged.

According to the invention there is provided an energy regulator for thermostatically controlling supply of electrical power to a heating element, the regulator comprising a temperature sensitive device arranged to provide actuation of a switch connected between the source of said electrical pow r and said heating element, in dependence upon a mechanical characteristic thereof, wh rein said mechanical characteristic, and thus the temperatur at which th switch is actuat d, can be influenced by a manually-operabl setting d vice comprising first and second members arranged to be slideably m veable r lativ t each other along a rectilinear path, th first member having a cam surface and th second member being co-operable with said cam surface to influence, as a result f said sliding m vement, the said mechanical characteristic of said temperture sensitive device.

Preferably the first member is substantially immobile in the direction extending along the path and the second member is slideably moveable along the path, in contact with the cam surface.

The first member is also preferably pivotally mounted to a supporting body so that it may be raised or lowered by movement of the second member along the cam surface.

The temperature sensitive device is preferably connected to the switch via a resilient member, and the manually-operable setting device is arranged to set the extent of a variable angular disposition between the resilient member and the temperature sensitive device.

The temperature sensitive device is preferably arranged to vary the set angular disposition in accordance with the temperature of the heating element, so as to cause actuation of the switch, via the resilient element.

The switch preferably comprises a first electrical contact connected to the end of the first member which is remote from the pivoted end, and a second electrical contact actuated by the resilient member, when the angular disposition between the resilient member and the temperature sensitive device, which is preferably a bi-metallic temperature sensor, varies by a sufficient extent from the set angular disposition, at which time the temperature of the heating element should be substantially the same as the required temperature thereof.

The invention will now be further described by way of example only with reference to the accompanying drawings, wherein:

Figure 1 shows a schematic view of a preferred embodiment of the present invention, and

Figure 2 shows a simple circuit means therefor.

Referring to Figure 1, a member 2 is mounted in a supporting body 1 and is moveable therein along a rectilinear path in either of directions A and B. A cam member 3 is pivotally mounted by a hinge 5 to an upstanding end portion 4 of the supporting body 1.

The slideable member 2 is kept constantly in contact with a cam surface 6 of the cam member 3. Consequently, as the member 2 is slideably moved in direction A or B, pivotal movement of the cam member 3 in the directions shown by arrow 3, about the hinge 5, is effected.

A pair of electrical contacts, 8 and 9, which are generally closed, are provided at end 7 of the cam member 3, which is remote from the hinged end thereof, electrical contact 8 being in contact with end 7, so that any upward or downward movement of the nd 7, caused by the pivotal mov ment of the cam member 3, will cause both contact 8 and 9 t m v accordingly.

Th electrical contact 9 is connected t n nd of a bi-metallic t mperature sens r 11, via a spring 14, th bi-m tallic temperature sensor 11 and th spring 14 being angularly disposed relative to each other. As th temperature of an ancillary heating lement

12 increases, the bi-metallic temperature s nsor straightens, thus changing the angular disposition betwe n it and the spring 14, until a p int is reached wh re the spring 14 causes contact 9 to snap upwards away from contact 8.

Figure 2 shows a single circuit including contacts 8 and 9, ancillary heating element 12 and a primary heating element 13, connected effectively in parallel with the ancillary heating element 12. The primary heating element 13 is preferably the actual heating element of the appliance, in which the energy regulator is used, and the ancillary heating element 12 is used to move the bi-metallic temperature sensor 11, shown in Figure 1.

In operation of the energy regulator in accordance with the invention, member 2 is slideably moved to a predetermined position, dependent on the required temperature of the heating element, along the supporting body 1 in direction B, thus providing an upward pivotal movement of the cam member 3, and thus of closed contacts 8 and 9, to produce a set angular disposition, also dependent on the required temperature of the heating element, between bi-metallic temperature sensor 11 and spring 14. As energy is supplied to both of the heating elements, the bi-metallic temperature sensor straightens as it senses the temperature of the ancillary element 12. The set angular disposition between bi-metallic temperature sensor 11 and spring 14 is thus caused to change, until they reach a position where the spring 14 causes contact 9 to snap away from contact 8, thus disconnecting the energy supply to both heating elements, which should have reached the required temperature at this instant. As the temperature of the heating elements subsequently decrease, the bi-metallic temperature sensor bends upwards again, changing the angular disposition back to its set state, until the spring 14 causes contact 9 to snap back into contact with contact 8 and thereby causing re-connection of the energy supply to the heating elemnts.

It can therefore be envisaged that continuation of this operation provides regulation of the energy supply to the primary heating element 13, which is used, for example, for cooking purpses, so that the set required temperature thereof may be substantially maintained.

In practice, a positive bias may be used to maintain contact between the cam surface 6 and the slideable member 2, rather than simply relying on gravity to maintain the contact. The positive bias may be provided by the hinge 5, which can be constructed to be resilient and to urge the cam member 3 downwards. If desired, however, a spring r other separate resilient means could be used.

Slideable member 2 may itself be used as a user-operable control with a temperature scale marked along the body 1 r, alt matively, m mber 2 may be connected to a further user-operable slideable contr l including a temperature scal on a heating appliance, such as a co k r.

In an alternative mbodiment of the inventi n, th cam member 3 may be slideably m veable relativ to the memb r 2, although this emb diment would requir substantially more space to accomm date the generally h rizontal m vement of th cam member al ng th rectilin ar path than the space required in the preferred mbodiment.

Further alternative configurations in accordance with the invention may of course be envisaged by persons of ordinary skill in the art.

CLAIMS

1. An energy regulator for thermostatically controlling supply of electrical power to a heating element, the regulator comprising a temperature sensitive device arranged to provide actuation of a switch connected between the source of said electrical power and said heating element, in dependence upon a mechanical characteristic thereof, wherein said mechanical characteristic, and thus the temperature at which the switch is actuated, can be influenced by a manually-operable setting device comprising first and second members arranged to be slideably moveable relative to each other along a rectilinear path, the first member having a cam surface to influence, as a result of said sliding movement, the said mechanical characteristic of said temperature sensitive device.

2. An energy regulator as claimed in Claim 1 wherein the first member is substantially immobile in the direction extending along said path and the second member is slideably moveable along said path.

3. An energy regulator as claimed in Claim 1 or 2 wherein the second member is in contact with the cam surface.

4. An energy regulator as claimed in Claim 1, 2 or 3 wherein the first member is pivotally mounted to a supporting body.

5. An energy regulator as claimed in Claim 4 wherein the second member is slideably mounted to the supporting body.

6. An energy regulator as claimed in any preceding claim wherein said temperature sensitive device is connected to said switch via a resilient member, the manually-operable setting device being arranged to set the extent of a variable angular disposition between said resilient member and said temperature sensitive device.

7. An energy regulator as claimed in Claim 6 wherein said temperature sensitive device is arranged to vary the set angular disposition in accordance with the temperature of the heating element, so as to cause actuation of said switch, via said resilient member.

8. An energy regulator as claimed in any preceding claim wherein said switch comprises a first electrical contact in contact with the first member, and a second electrical contact connected tô said temperature sensitive device via said resilient member.

9. An nergy regulator as claimed in any preceding claim wherein th temperatur sensitive device is a bi-metallic temperature sensor.

10. An energy regulator as claimed in any preceding claim wherein said heating element includes a primary heating lement and an ancillary heating elem nt, the ancillary heating lem nt b ing used to

provid actuation of said temperature sensing means.

11. An nergy regulator as claimed in Claim 10 wh rein th primary heating lement is a heating element of a cooking appliance.

12. An energy regulator substantially as herein described with reference to the accompanying drawings.

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